

Public Employees' Retirement Fund (PERF) Strategic Asset Allocation – Recommendation

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Asset Allocation/Risk Management

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Baseline Candidate Portfolios

	A1	A2	A3	A4	A5	A6	A7	A8
COMPOUND RETURN	6.00%	6.25%	6.50%	6.75%	7.00%	7.25%	7.38%	7.49%
VOLATILITY	7.59%	8.20%	8.90%	9.66%	10.50%	11.41%	11.92%	12.51%
AVERAGE RETURN	6.27%	6.57%	6.87%	7.19%	7.52%	7.85%	8.04%	8.21%
INCOME - Fixed Income	46.8%	42.21%	37.5%	32.6%	26.5%	19.7%	15.9%	15.0%
GROWTH - Public Equity	25.6%	28.03%	30.5%	33.1%	38.5%	45.3%	49.1%	53.1%
GROWTH - Private Equity	6.6%	8.76%	11.0%	13.3%	14.0%	14.0%	14.0%	14.0%
REAL - Real Estate	10.0%	10.00%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
REAL - Infrastructure & Forestland	3.0%	3.00%	3.0%	3.0%	3.0%	3.0%	3.0%	2.9%
INFLATION - Inflation-Linked Bonds	3.0%	3.00%	3.0%	3.0%	3.0%	3.0%	3.0%	1.0%
INFLATION - Commodities	1.0%	1.00%	1.0%	1.0%	1.0%	1.0%	1.0%	0.0%
LIQUIDITY - Treasuries	4.0%	4.00%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
GROWTH	32.2%	36.8%	41.5%	46.4%	52.5%	59.3%	63.1%	67.1%
INCOME	46.8%	42.2%	37.5%	32.6%	26.5%	19.7%	15.9%	15.0%
REAL	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	12.9%
INFLATION	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	1.0%
LIQUIDITY	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%

- Candidate portfolios are potential alternative policy portfolios
- Eight candidate portfolios are listed
 - From most conservative bond-centric A1 to the equity-dominant A8
 - Each portfolio is intended to be the least risky for its target return
 - A7 is very similar to the current policy portfolio

Preference Scores

Decision Factors

Improve Funding Level
 Avoid Deterioration in Funding Level
 Minimize Employer Contribution Rates
 Stabilize Employer Contribution Rates
 Total

Consensus

40%
 10%
 37%
 13%
100%

Portfolio Rankings

Rank	Candidate Asset Mix	Preference Score	Expected Return	Expected Risk
1	8	6.86	7.49%	12.51%
2	6	6.36	7.25%	11.41%
3	7	6.26	7.38%	11.92%
4	5	4.85	7.00%	10.50%
5	3	4.50	6.50%	8.90%
6	4	4.50	6.75%	9.66%
7	2	3.49	6.25%	8.20%
8	1	3.18	6.00%	7.59%

Asset Allocation Candidate Mixes – A8 & Alternatives

	A8	A8.1	A8.2	A8.3	Current
COMPOUND RETURN	7.49%	7.53%	7.54%	7.56%	7.38%
VOLATILITY	12.51%	12.51%	12.51%	12.51%	11.97%
AVERAGE RETURN	8.21%	8.25%	8.26%	8.29%	8.05%
INCOME - Fixed Income	15.0%	15.0%	15.0%	15.0%	20.00%
GROWTH - Public Equity	53.1%	53.1%	53.2%	52.6%	49.00%
GROWTH - Private Equity	14.0%	14.0%	14.0%	14.0%	14.00%
REAL - Real Estate	10.0%	10.0%	10.0%	10.0%	10.00%
REAL - Infrastructure & Forestland	2.9%	3.0%	3.0%	5.0%	2.50%
INFLATION - Inflation-Linked Bonds	1.0%	1.9%	2.8%	1.0%	1.00%
INFLATION - Commodities	0.0%	1.0%	1.0%	0.4%	1.50%
LIQUIDITY - Treasuries	4.0%	2.0%	1.0%	2.0%	2.00%
GROWTH	67.1%	67.1%	67.2%	66.6%	63.0%
INCOME	15.0%	15.0%	15.0%	15.0%	20.0%
REAL	12.9%	13.0%	13.0%	15.0%	10.0%
INFLATION	1.0%	2.9%	3.8%	1.4%	5.0%
LIQUIDITY	4.0%	2.0%	1.0%	2.0%	2.0%

A8.1 = Liquidity \geq 2%

A8.2 = Liquidity \geq 1%

A8.3 = Infra_Forest \leq 5%

Portfolio A8 – Risk Attributes

- Base case scenario (expected return of 7.49%) has a 50% probability of the funded ratio reaching 71% at the end of 10 years from the current level of 65% (slide 9)
- On the upside, the probability of achieving a funded ratio of 96% is 20% at the end of 10 years (slide 9)
- On the downside, there is a 20% probability of the funded ratio being 52% (slide 9)
- The downside risk is more pronounced in the weak growth case (expected return) with a 20% probability that the funded ratio is less than 38% (slide 10)
- Under the weak growth case, the expected funded ratio (50% probability) at the end of 10 years is 53% (slide 10)

Portfolio A8 – Risk Attributes (cont.)

- The expected employer contribution rate (50% probability) at the end of 10 years is 24% and there is a 20% probability that the contribution rate is more than 33% (slide 11)
- Under the weak growth case, the expected employer contribution (50% probability) is 32% and there is a 20% probability that the contribution rate is more than 42% (slide 12)
- Portfolio A8 has 67% growth (equity) exposure and only 1% exposure to inflation hedging assets. The 0% allocation to commodities would require selling the current \$2.5 billion commodity position.
- Portfolio A8.1 is a more practical alternative to A8 with a 1% allocation to Commodities and a Liquidity (Treasury) allocation reduction from 4% to 2%

Asset Allocation Candidate Mixes – A7 & Alternatives

	A7	A7.1	A7.2	A7.3	A7.4	A7.5	Current
COMPOUND RETURN	7.38%	7.39%	7.39%	7.43%	7.44%	7.46%	7.38%
VOLATILITY	11.92%	11.92%	11.92%	11.92%	11.92%	12.20%	11.97%
AVERAGE RETURN	8.04%	8.05%	8.05%	8.09%	8.10%	8.15%	8.05%
INCOME - Fixed Income	15.9%	18.0%	19.0%	15.0%	16.5%	16.0%	20.00%
GROWTH - Public Equity	49.1%	49.0%	49.0%	48.5%	48.5%	51.0%	49.00%
GROWTH - Private Equity	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.00%
REAL - Real Estate	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.00%
REAL - Infrastructure & Forestland	3.0%	3.0%	3.0%	5.0%	5.0%	3.0%	2.50%
INFLATION - Inflation-Linked Bonds	3.0%	3.0%	3.0%	2.5%	3.0%	3.0%	1.00%
INFLATION - Commodities	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.50%
LIQUIDITY - Treasuries	4.0%	2.0%	1.0%	4.0%	2.0%	2.0%	2.00%
GROWTH	63.1%	63.0%	63.0%	62.5%	62.5%	65.0%	63.0%
INCOME	15.9%	18.0%	19.0%	15.0%	16.5%	16.0%	20.0%
REAL	13.0%	13.0%	13.0%	15.0%	15.0%	13.0%	10.0%
INFLATION	4.0%	4.0%	4.0%	3.5%	4.0%	4.0%	5.0%
LIQUIDITY	4.0%	2.0%	1.0%	4.0%	2.0%	2.0%	2.0%

A7.1 = Liquidity \geq 2%, same risk as A7

A7.2 = Liquidity \geq 1%

A7.3 = Infra_Forest \leq 5%

A7.4 = Liquidity \geq 2% & Infra_Forest \leq 5%

A7.5 = Liquidity \geq 2%

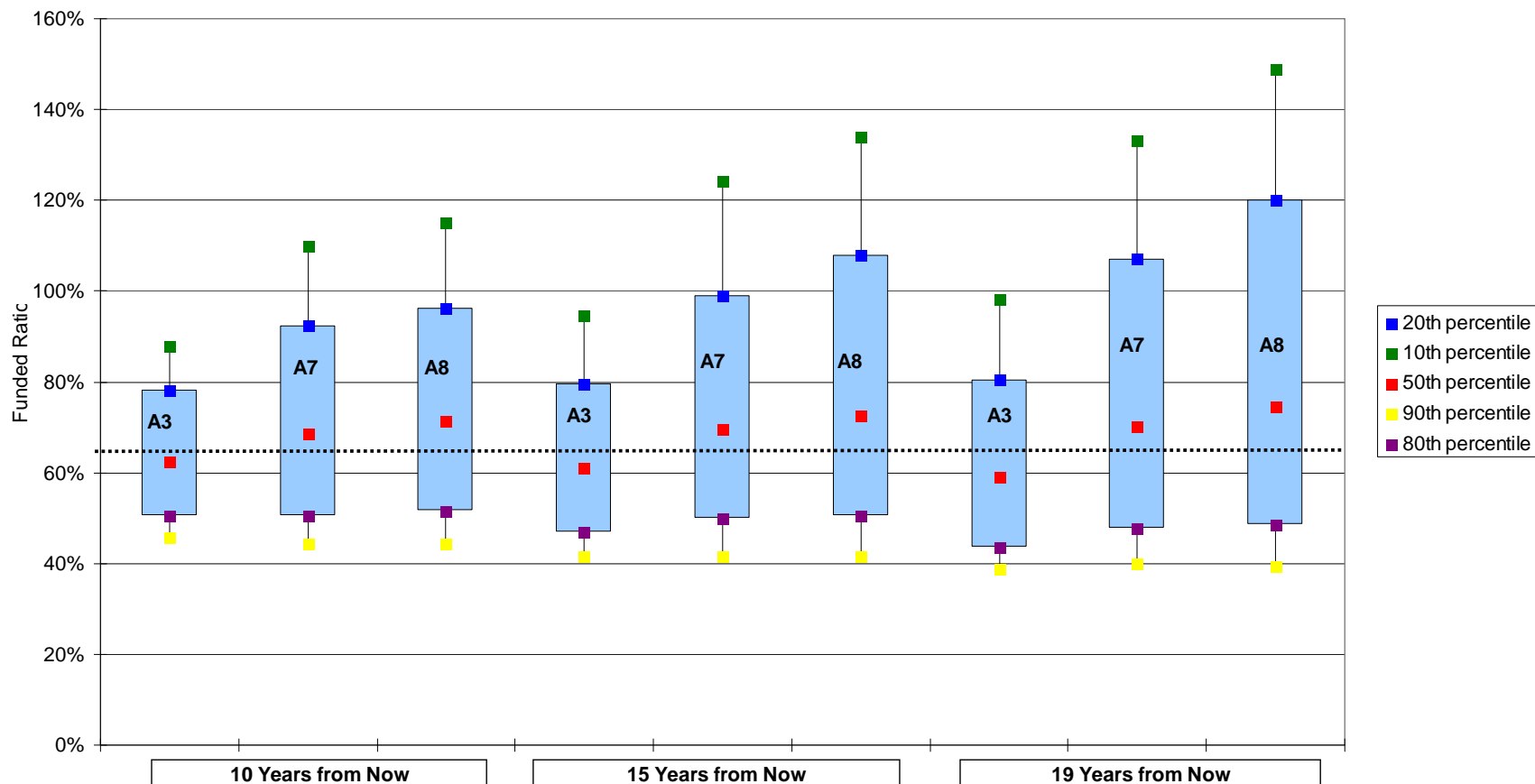
Portfolio A7 – Risk Attributes

- Base case scenario (expected return of 7.38%) has a 50% probability of the funded ratio reaching 68% at the end of 10 years from the current level of 65% (slide 9)
- On the upside, the probability of achieving a funded ratio of 92% is 20% at the end of 10 years (slide 9)
- On the downside, there is a 20% probability of the funded ratio being less than 50% (slide 9)
- The downside risk is more pronounced in the weak growth case (expected return) with a 20% probability that the funded ratio is less than 38% (slide 10)
- Under the weak growth case, the expected funded ratio (50% probability) at the end of 10 years is 53% (slide 10)

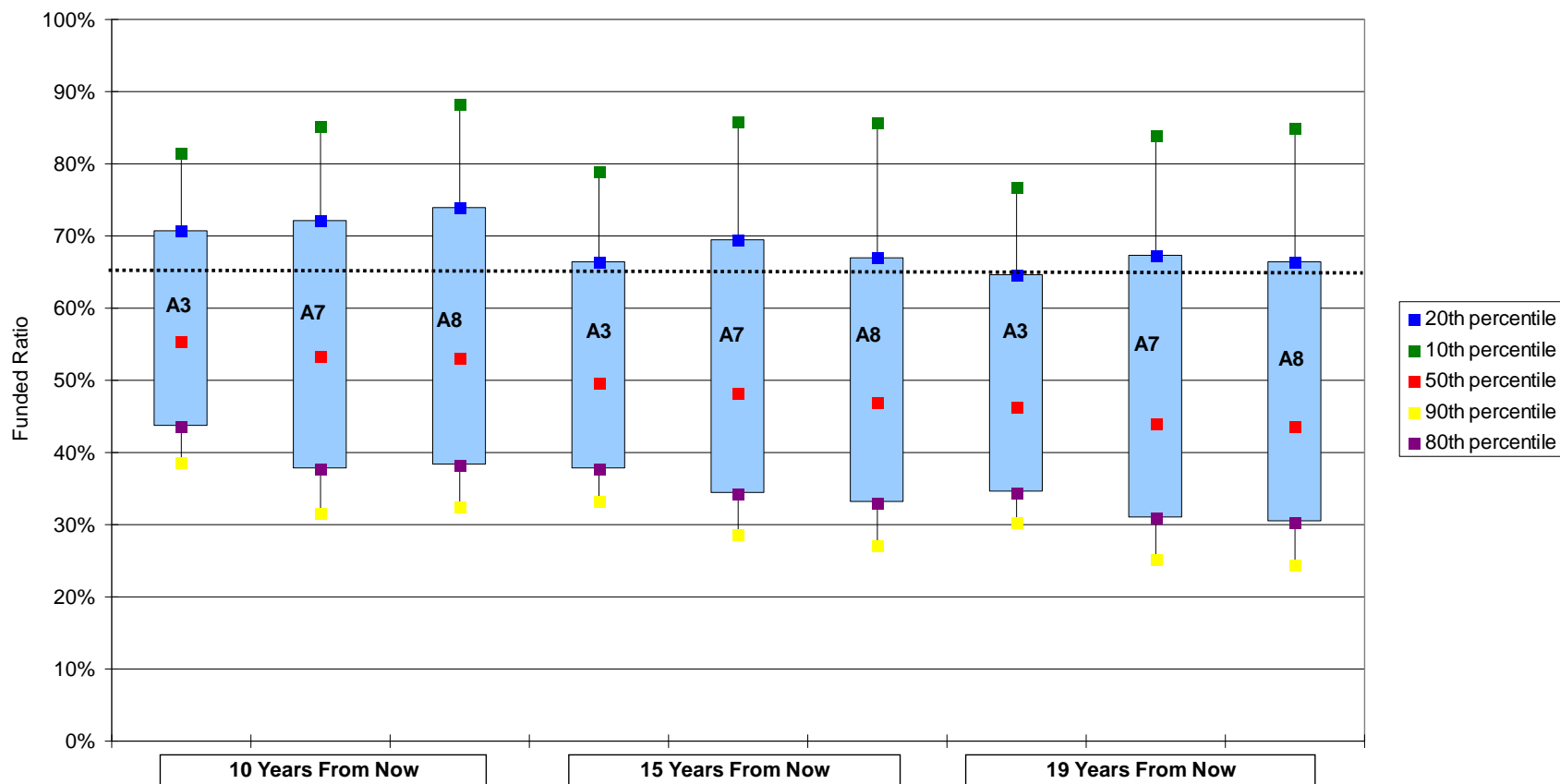
Portfolio A7 – Risk Attributes (cont.)

- The expected employer contribution rate (50% probability) at the end of 10 years is 24% and there is a 20% probability that the contribution rate is more than 33% (slide 11)
- Under the weak growth case, the expected employer contribution (50% probability) is 32% and there is a 20% probability that the contribution rate is more than 42% (slide 12)
- Portfolio A7 has 63% growth (equity) exposure and a 4% allocation to each of the Inflation and Liquidity buckets

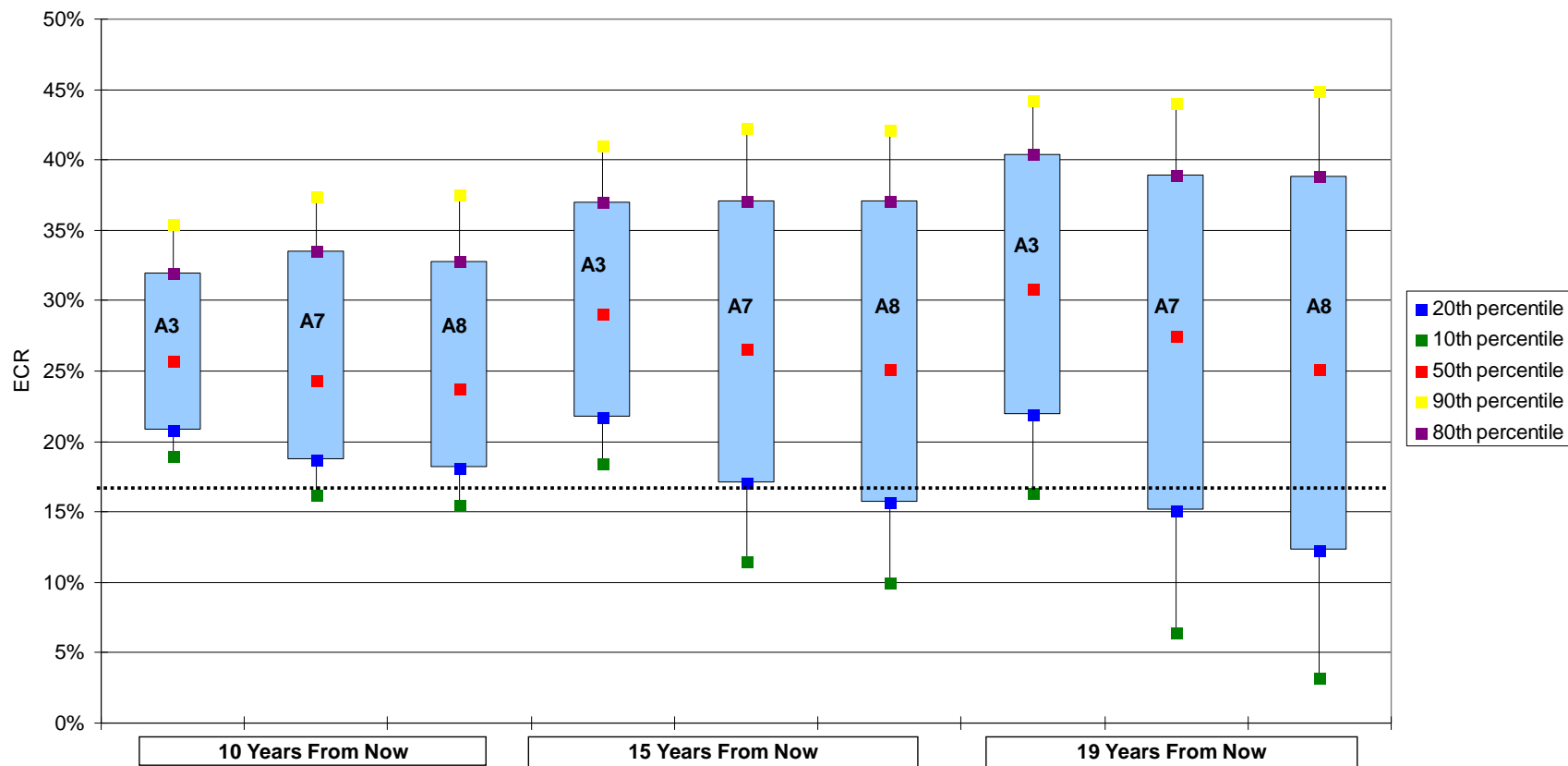
Projected Funded Ratios for Candidate Mixes 3, 7 and 8 in Three Different Time Periods: 10, 15 and 19 Years From Now (Base Case)



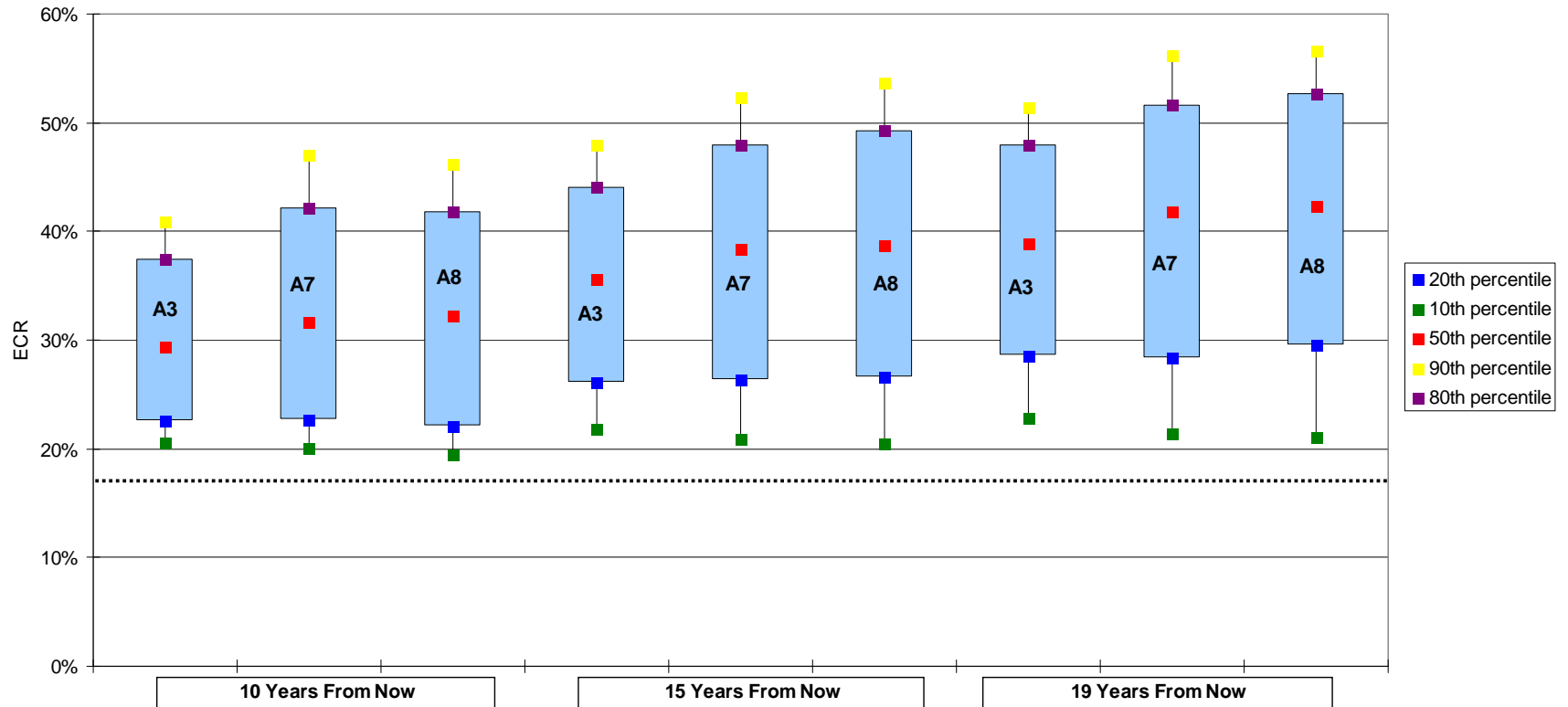
Projected Funded Ratios for Candidate Mixes 3, 7 and 8 in Three Different Time Periods: 10, 15 and 19 Years From Now (30% Weak Growth Case)



Projected Employer Contribution Rates for Candidate Mixes 3, 7 & 8 in Three Different Time Periods: 10, 15 and 19 Years From Now (Base Case)



Projected Employer Contribution Rates for Candidate Mixes 3, 7 and 8 in Three Different Time Periods: 10, 15 and 19 Years From Now (30% Weak Growth Case)



Conclusions

- Portfolios A7.3 and A7.4 are not recommended due to the 5% target to Infrastructure and Forestland
- Portfolios A7; A7.1; and A7.5 are viable alternatives at the current level of risk. A8.1 is viable, although at a higher risk level
- All of the Portfolios presented on slides 2 and 5 have an expected return in the range of 7.38% to 7.56% annualized

Conclusions

- Portfolio A8 is not recommended since it would require selling off the commodity portfolio
- Portfolio A8.2 is not recommended since the Liquidity allocation is too low at 1%
- Portfolio A8.3 is not recommended as the 5% target to Infrastructure and Forestland could be infeasible to implement
- Portfolio A8.1 is a viable alternative to A8 if the Committee decides to take this level of risk which is higher than the risk of the current portfolio
- Similarly, Portfolio A7.2 is not recommended as the liquidity position is too low at 1%

Portfolios for Consideration

	A7	A7.1	A7.5	A8.1	Current
COMPOUND RETURN	7.38%	7.39%	7.46%	7.53%	7.38%
VOLATILITY	11.92%	11.92%	12.20%	12.51%	11.97%
AVERAGE RETURN	8.04%	8.05%	8.15%	8.25%	8.05%
INCOME - Fixed Income	15.9%	18.0%	16.0%	15.0%	20.00%
GROWTH - Public Equity	49.1%	49.0%	51.0%	53.1%	49.00%
GROWTH - Private Equity	14.0%	14.0%	14.0%	14.0%	14.00%
REAL - Real Estate	10.0%	10.0%	10.0%	10.0%	10.00%
REAL - Infrastructure & Forestland	3.0%	3.0%	3.0%	3.0%	2.50%
INFLATION - Inflation-Linked Bonds	3.0%	3.0%	3.0%	1.9%	1.00%
INFLATION - Commodities	1.0%	1.0%	1.0%	1.0%	1.50%
LIQUIDITY - Treasuries	4.0%	2.0%	2.0%	2.0%	2.00%
GROWTH	63.1%	63.0%	65.0%	67.1%	63.0%
INCOME	15.9%	18.0%	16.0%	15.0%	20.0%
REAL	13.0%	13.0%	13.0%	13.0%	10.0%
INFLATION	4.0%	4.0%	4.0%	2.9%	5.0%
LIQUIDITY	4.0%	2.0%	2.0%	2.0%	2.0%

Asset Class Return Forecasts and Constraints

Forecast Expected Values and Volatilities of Returns

	Compound Return	Volatility	Arithmetic Return	Constraints	
				Min	Max
Fixed Income	3.75%	6.50%	3.95%	15%	100%
Public Equity	7.75%	16.00%	8.93%	0%	100%
Private Equity (AIM)	9.00%	26.00%	12.06%	0%	14%
Real Estate	7.00%	14.00%	7.91%	0%	10%
Infras. & Forestland	7.00%	10.00%	7.47%	1%	3%
Inflation Linked Bonds	3.50%	6.00%	3.67%	1%	3%
Commodities	5.00%	21.00%	7.08%	0%	1%
Liquidity (Treasuries)	3.25%	6.20%	3.44%	4%	100%

Source of returns & volatilities of Fixed Income, Public Equity, Private Equity, and Real Estate = Sept. 2010 IC memo

Source of returns & volatilities of other investments = CalPERS Staff

Source of investment min. and max. = CalPERS Staff based on investability and preference for gradual changes

Forecast Correlations

	Fixed Income	Public Equity	Private Equity (AIM)	Real Estate	Infras. & Forestland	Inflation Linked Bonds	Commodities
Fixed Income	1.00						
Public Equity	0.10	1.00					
Private Equity (AIM)	0.10	0.80	1.00				
Real Estate	0.15	0.35	0.25	1.00			
Infras. & Forestland	0.25	0.45	0.35	0.40	1.00		
Inflation Linked Bonds	0.55	0.00	0.00	0.18	0.15	1.00	
Commodities	0.00	0.10	0.05	0.23	0.20	0.20	1.00
Liquidity (Treasuries)	0.92	0.10	0.10	0.15	0.20	0.60	0.00

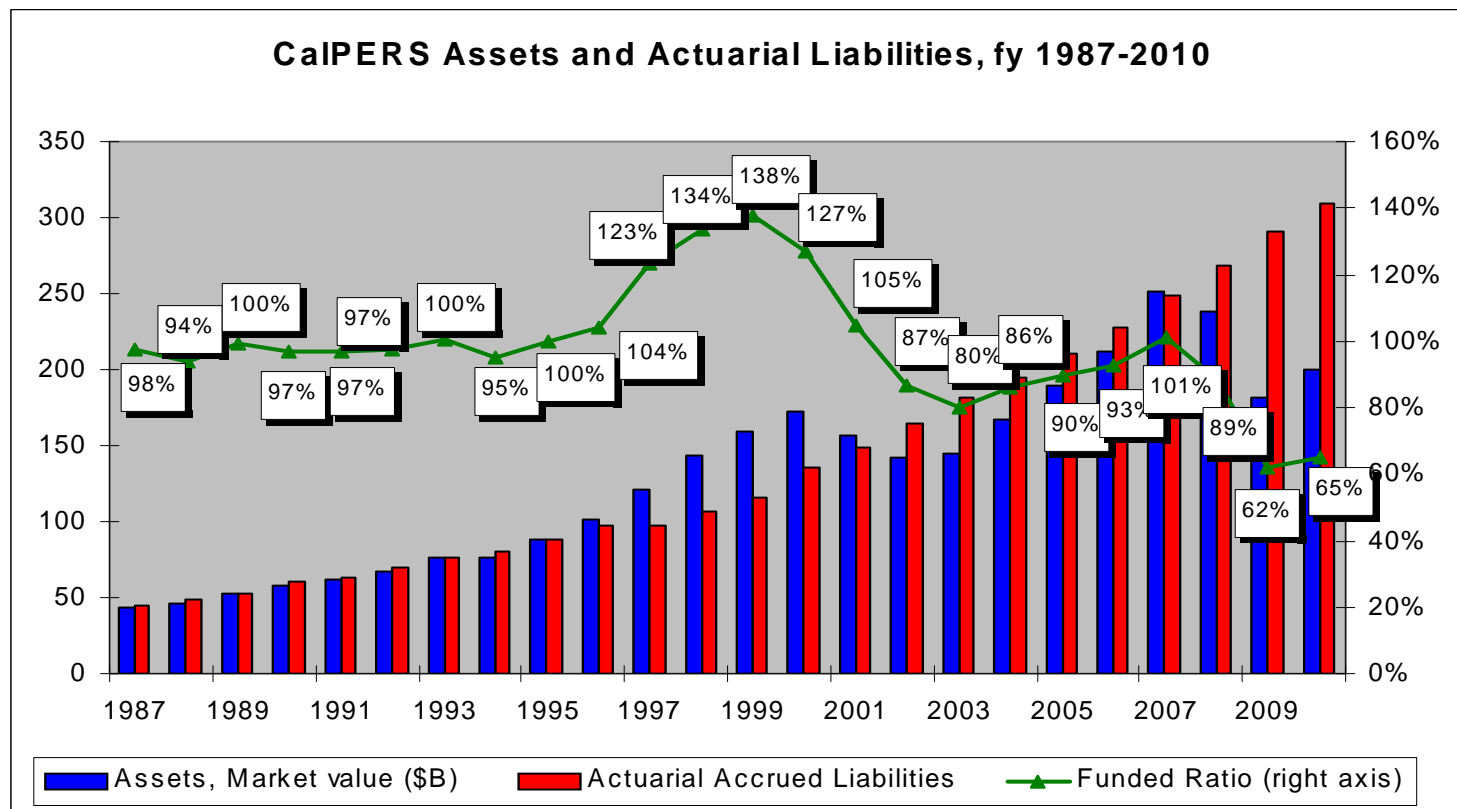
Source of correlations for Fixed Income, Public Equity, Private Equity, and Real Estate = June 2010 IC memo

Source of other correlations = CalPERS Staff

Historical Asset Allocation Policies

CLASSIFICATION		1993	1995	1997	2000		2002	2004		2008	2009
CASH		2%	2%	1%	0%		0%	0%		0%	2%
FIXED INCOME	Domestic	37	24	24	24		–	–		–	–
	International	4	4	4	4	Global	26	26		19	22
TOTAL FIXED INCOME		41	28	28	28		26	26		19	22
EQUITIES	Domestic	33	38	41	39		39	40		–	–
	International	12	20	20	19		19	20	Global	56	49
	AIM	4	5	4	6		7	6		10	14
TOTAL EQUITIES		49	63	65	64		65	66		66	63
REAL ESTATE		8	7	6	8		9	8		10	10
INFLATION-LINKED ASSETS (ILAC)		–	–	–	–		–	–		5	5
TOTAL		100%	100%	100%	100%		100%	100%		100%	100%

Objectives - CalPERS Funded Ratio



Liabilities growing at 8.5% annually since 2000